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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,364	11/24/2003	Peter F. Corbett	112056-0172	4727

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EXAMINER

NAMAZI, MEHDI

ART UNIT PAPER NUMBER

2189

DATE MAILED: 03/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/720,364	Applicant(s) CORBETT ET AL.	
	Examiner Mehdi Namazi	Art Unit 2189	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/07/2005; 7/08/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to application filed November 24, 2003.

Claim Objections

Claim 1 is objected to because of the following informalities:

With regard to claims 1, 10, and 20, lines 6-7, and claim 21, lines 7-8, "recalculation or moving of any blocks containing data" should be replaced with --recalculation of parity or moving of any blocks containing data—see specification page 10, line 10. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Clark et al. (US. Patent 4,761,785).

With regard to claims 1, 10, 20 and 21, Clark teaches a method for distributing parity across a disk array (col. 8, lines 25-26), the method comprising:

Adding a new disk to pre-existing disks of the array (col. 8, lines 12-13); dividing each disk into blocks (fig. 2), the blocks being organized into strips such that each strip

contains one block from each disk (fig. 2); and distributing parity among blocks of the new and pre-existing disks without recalculation or moving of any blocks containing data (col. 8, lines 25-31; the parity blocks of an existing set are redistributed to include the new added unit, the parity blocks are zeroed so there is not any data block movement).

With regard to claim 10, Clark also teaches a storage module to compute parity in blocks of stripes across the disks and reconstruct blocks of disk lost as a result of failure (fig. 1, element 40 disk controller).

With regard to claim 2, Clark teaches the step of distributing comprises the step of distributing parity among blocks of new and pre-existing disks in a manner that maintains a fixed pattern of parity blocks among stripes of the disks (fig. 2 shows the distribution of parity blocks evenly, however with regard to strip 9 it is an unprotected stripes).

With regard to claim 3, Clark teaches the step of changing an assignment for one or more blocks containing parity of pre-existing disk to the newly added disk (as each parity blocks moves from one storage to another storage and different strip the assignment changes).

With regard to claim 4, Clark teaches the step of initializing the added disk so as to not affect parity of the stripes (col. 8, lines 13-14, the new member is zeroed).

With regard to claim 5, Clark teaches the step of reassigning blocks containing parity in certain stripes to the new disk without calculation or writing of parity (col. 8, lines 12-20).

With regard to claim 6, wherein the certain stripes comprise $1/N$ of the stripes, where N is equal to the number of disks in the array (fig. 2).

With regard to claim 7, the step of changing a block containing parity to a block containing data and not changing a data block to a parity block (col. 8, lines 27-30 by setting the parity blocks to zero).

With regard to claim 8, Clark teaches the step of reassigning one of N blocks containing parity from each pre-existing disk to the added disk (fig. 2), wherein N is equal to the number of disks in the array (fig. 2).

With regard to claim 9, Clark teaches the step of reassigning one of N parity blocks to the new disk (col. 8, lines 25-26), with each pre-existing disk continuing to hold $1/N$ of the parity blocks in the array (fig. 2).

With regard to claim 11, Clark teaches a table configured to store parity assignment calculated for one of a known group size of the disk array and a maximum group size of the array (col. 4, lines 20-22), the stored parity assignments defining a

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repeat interval of a parity distribution pattern used to determine locations of parity storage on any disk in the array (fig. 3).

With regard to claim 12, the storage module is embodied as a RAID system of the storage system (fig. 2, shows the storage with parity blocks).

With regard to claim 13, Clark teaches the storage module is embodied as an internal disk array (fig. 1).

With regard to claim 14, Clark teaches the storage module is embodied as a disk array control system externally coupled to the storage system (fig. 1).

With regard to claim 15, Clark teaches the disk array is a block-based RAID array (fig. 2).

With regard to claim 16, Clark teaches a method of distributing commodities over containers of a system (fig. 2 shows the distribution of parities of the disks), the method comprising the steps of: adding a new container to pre-existing containers of the system to thereby provide N containers (col. 8, line 23), moving only $1/N$ of the commodities to the new container (fig. 2).

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With regard to claim 17, Clark teaches the system is a storage system (fig. 2), the commodities are data structures adapted for storage devices of an array (parity blocks), and the containers are storage entities coupled to the array (fig. 2).

With regard to claim 18, Clark teaches wherein the storage entities are storage heads (fig. 3).

With regard to claim 19, Clark teaches the data structures are inode file blocks (fig. 2).

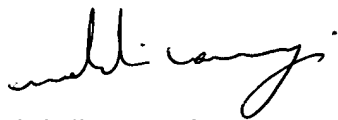
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mehdi Namazi whose telephone number is 571-272-4209. The examiner can normally be reached on Monday-Friday 8:30-5:00.

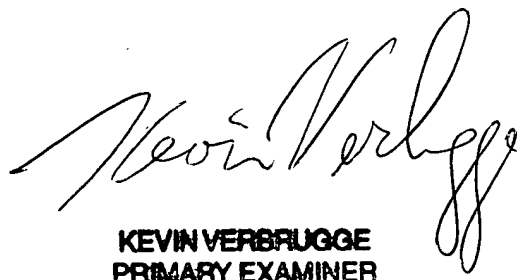
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Reginald Bragdon can be reached on 571-272-4204. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Mehdi namazi
February 28, 2006



KEVIN VERBRUGGE
PRIMARY EXAMINER